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COMPLETE SPECIFICATION

Improvements in or relating to the Production of Coated Frozen Confections or Frozen Food Products

We, INTERNATIONAL PATENTS DEVELOPMENT COMPANY, of 17, Battery Place, Wilmington, Delaware, United States of America, a corporation organised under the laws of the State of Delaware, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the production of frozen or low temperature confections, or frozen food products such as ice cream bars which are covered with edible coatings; and the primary object of the invention is to provide an improved coating for confections or food products of this type, more especially for ice cream bars or other bodies or articles made of ice cream or like compounds requiring low temperature storage.

The coatings heretofore used for ice cream bars have been composed of a fat containing substance such as chocolate to which additional fat substance and sugar have sometimes been added; and the method is to dip the bars into the melted coating substance, the fat of which may amount to 50% of the whole congeals in contact with the cold ice cream so that coatings are formed on the bars that make the articles easier to handle.

A coating of this sort is subject to certain objections and limitations: the coating is hard and brittle at the temperature of the ice cream, giving an unpleasant sensation in the mouth and having a tendency to crack and break away in large pieces from the bar when the bar is bitten into or cut; the coating is practically limited to one which is chocolate flavored, chocolate apparently being the only fat containing substance that has been found usable for this purpose; it is necessary to use a chocolate high in fats, and this increases the cost of the article; any coating consisting primarily of chocolate is quite expensive; also the dipping temperature is undesirably high.

According to the present invention coatings on frozen confections or frozen food products are obtained by applying thereto a mixture essentially comprising solid

anhydrous dextrose and a saturated or slightly supersaturated solution of dextrose hydrate.

The production of the coating involves the hydration of the anhydrous dextrose, that is, the re-crystallization of the anhydrous dextrose as dextrose hydrate, which takes place in the presence of a saturated solution of dextrose hydrate during the formation of the coating due to the fact that at any temperature below 122° F. a supersaturated or saturated solution of dextrose hydrate is unsaturated with respect to anhydrous dextrose, so that the anhydrous dextrose goes into solution and dextrose crystallizes out of solution as the hydrate. Among the advantages accruing from the use for ice cream bars and like articles of coating material compounded on this principle are the following: a coating is provided which is soft, firmly adherent to the ice cream and of much the same texture and consistency as the ice cream itself so that when the bar is eaten or cut with a knife, fork or spoon, the coating will not crack and break away from the bar to any extent; the coating is not limited to a chocolate flavor or to the color of chocolate, but can be flavored with any desired flavoring material and can be given any desired color; if a chocolate coating is desired, it is possible to use only so much chocolate as may be necessary to give the desired flavor, and it is possible to use cocoa, i.e. chocolate from which a large part of the fat has been removed, which reduces cost; and coating by dipping is facilitated because of the lower dipping temperature.

In exemplification of the invention two specific examples will be given, one for a chocolate flavored coating and the other for a coating having some other desired flavor. The formulas given are purely exemplary and illustrative and are not to be considered as limiting the invention to the preferred data given.

EXAMPLE 1.

FORMULA FOR CHOCOLATE ICE CREAM COATING.

The following ingredients are used in substantially the proportions by weight as follows:

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follows, these materials being divided into three groups to indicate the preferred method of compounding:—

- (a) 300 parts anhydrous dextrose
- 50 parts corn syrup (43° Baume glucose)
- 2 parts powdered dextrose hydrate
- 105 parts water
- (b) 220 parts dextrose hydrate or anhydrous dextrose
- 130 parts water
- 100 parts cocoa
- 1 part salt
- (c) 15 parts gelatin
- 100 parts water

A fondant is first prepared by combining the ingredients in the (a) group. The corn syrup is dissolved in the water, preferably at ordinary room temperature, or slightly above, the dextrose added, and the mixture beaten until palpable graininess disappears. The product is a fondant of very fine crystals.

The ingredients of the (b) group are placed in a double boiler and heated until the sugar is all in solution. The gelatin of group (c) is dispersed in the water by heating. While the (b) and (c) ingredients are still warm, they are beaten uniformly into the fondant formed from the (a) ingredients. If the resulting mixture is too viscous for dipping at the working temperature of about 86° F., it is warmed to 95°—104° F., and then cooled

quickly to 86° F. before using.

Ice cream which has been molded or formed into the desired shape and cooled to a temperature near that of dry ice is then coated with this mixture by dipping the bars or other forms into the mixture with the latter preferably at about 86° F. The coated pieces are then placed in a chamber and cooled at approximately the temperature of dry ice until hard enough to handle. After which, it may be held at the preferred storage temperature for the ice cream.

The first step of the process, that is the preparation of the coating brings about the hydration of the anhydrous dextrose.

With the proportions indicated and at ordinary room temperature, in fact at any temperature below 132° F., the solution will be unsaturated in respect to anhy-

drous dextrose but saturated in respect to hydrate dextrose; so that in the coating mixture the anhydrous dextrose will go into solution and dextrose hydrate crystallize out of the solution, the crystallization of the hydrate continuing after the coating has been transferred to the ice cream bars because of the lower temperature to which the coating is exposed. The quantity of water used is such that the coating compound will be

unsaturated as to the anhydrous form of dextrose but slightly supersaturated with respect to the hydrate form.

The small quantity of crystalline hydrate dextrose, preferably powdered, mentioned in group (a) above is used to provide nuclei for initiating the desired hydrate crystallization. If, however, ordinary commercial anhydrous dextrose is used, particularly if the anhydrous dextrose be powdered, it may not be necessary to use the dextrose hydrate for nucleation, since commercial anhydrous dextrose is always to some slight extent, at least, hydrated.

It is preferable to use a certain amount of non-crystallizable sugar substance, such as the corn syrup, specified, and a certain amount of an edible colloidal substance, such as gelatin, in order to give the coating a close and smooth texture. The fat of the cocoa, of which the cocoa contains about 10 to 20%, is a desirable ingredient in order to give the coating the proper consistency and inhibit bubble formation. By using anhydrous dextrose as a primary ingredient and taking advantage of the fact that at room temperatures the saturated dextrose hydrate solution will be unsaturated in respect to the anhydrous dextrose it is possible to bring the coating material to a state of supersaturation, for the type of crystallization desired without any evaporating operation. Also one obtains, through the hydration of the anhydrous dextrose, a very great reduction in the particle size of the solid phase dextrose without having to completely dissolve the dextrose and bring about supersaturation through evaporation. Even finely ground crystalline dextrose is coarse as compared with the crystals which can be produced through the hydration of the anhydrous dextrose.

EXAMPLE 2.

FORMULA FOR NON-CHOCOLATE COATING.
The following ingredients are used in the proportions by weight as follows:—

- (a) 300 parts of anhydrous dextrose
- 50 parts corn syrup (43° Baume glucose)
- 2 parts powdered hydrate dextrose
- 105 parts water
- (b) 175 parts of 45% dextrose solution made by dissolving in water hydrate or anhydrous dextrose.
- (c) 7½ parts gelatin
- 50 parts water
- (d) 20 parts fat (melting point 92° F.)
- (e) Flavouring substances such as vanilla, lemon, orange, almond, etc., and/or coloring matter.

The corn syrup is dissolved, preferably at or near room temperature, in the quantity of water specified under (a), the solid dextrose added and the mixture 5 beaten until palpable graininess has disappeared.

The gelatin is dispersed in the water specified under (c) by heating in a double boiler, preferably below boiling temperature. The materials specified under (b), 10 (c), (d) and (e) are mixed uniformly in the fondant formed by the (a) ingredients, and the mixture applied to the ice cream bars as in Example 1.

15 The fat specified under (d) corresponds to the fat element in the cocoa of Example 1.

In each example the coating mixture at the dipping temperature, so far as the dextrose and water system is concerned, 20 consists of a suspension of finely divided anhydrous crystals in a slightly supersaturated solution of dextrose hydrate.

With the quantities of sugar and water 25 specified the supersaturation will necessarily be slight and this is important since material increase in the degree of supersaturation will result in coatings too viscous for convenience in dipping. Such 30 coatings do not adhere well to the ice cream and may require a long time for ageing to the point where the necessary amount of crystallization has taken place. The solid dextrose hydrate ultimately 35 formed in suspension owes its finely divided condition to re-crystallization through the agency of the hydration reaction of the anhydrous dextrose.

Having now particularly described and 40 ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A method of producing coatings on 45 frozen confections or frozen food products which consists in applying thereto a mixture essentially comprising solid anhydrous dextrose and a saturated or slightly supersaturated solution of dextrose 50 hydrate.

2. A method as claimed in claim 1 in

which a small amount of solid dextrose hydrate is incorporated to the mixture to initiate hydrate crystallization.

3. A method as claimed in claim 1 or 2 55 in which a non-crystallizable sugar substance is incorporated in the mixture.

4. A method as claimed in claim 1, 2 or 3 in which a fat and gelatin are 60 incorporated in the mixture.

5. A method as claimed in claim 2, 3 or 4 in which the mixture is produced from anhydrous dextrose, water and a small quantity of powdered hydrate dextrose which are beaten together to form a finely 65 grained fondant, whereafter dextrose dissolved in water is added to the fondant, and finally gelatin dispersed in water is added to the mixture.

6. A method as claimed in claim 2, 3, 70 4 or 5 in which a mixture of approximately 300 parts of anhydrous dextrose, 50 parts of corn syrup, 2 parts of dextrose hydrate and 105 parts of water, is beaten to form a fine grained fondant, whereafter there 75 is mixed into the fondant thus produced 175 parts of 45% dextrose solution, $7\frac{1}{2}$ parts of gelatin dispersed in 50 parts of water, and 20 parts of fat.

7. A method as claimed in claim 2, 3, 4 80 or 5, in which a mixture of approximately 300 parts of anhydrous dextrose, 50 parts of corn syrup, 2 parts of dextrose hydrate, and 105 parts of water, is beaten to form a fine grained fondant, whereafter there is 85 mixed into the fondant thus produced 220 parts of dextrose and 100 parts of cocoa dissolved and dispersed in 130 parts of water, and also 15 parts of gelatin dispersed in 100 parts of water. 90

8. The method of producing coatings on frozen confections and frozen food products substantially as set forth.

9. A frozen confection or frozen food product when coated in the manner 95 particularly described and ascertained.

Dated this 27th day of November, 1936.

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